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NOTES ON GEOGRAPHIC DISTRIBUTION

New record and distribution extension of *Phalloceros spiloura* Lucinda, 2008 (Cyprinodontiformes: Poeciliidae)

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ABSTRACT: *Phalloceros spiloura* Lucinda, 2008 is known from the coastal drainages of Rio Grande do Sul and Santa Catarina States, Iguaçu and Uruguai river basins. Its geographic distribution is herein extended to a new basin, the Laguna dos Patos system, an isolated costal drainage from Southern Brazil.

The monophyletic genus *Phalloceros* Eigenmann, 1907 comprises 22 species broadly distributed throughout southern and southeastern river basins in South America, being diagnosed by the preopercular canal partially closed and the presence of paired appendix in tip of the third gonopodial ray (Lucinda 2008). This genus was recently revised by Lucinda (2008), who recognized and described 21 new species in addition to *Phalloceros caudimaculatus* (Hensel, 1868).

Phalloceros species are small viviparous poecilids, being omnivorous, herbivorous, and detritivorous and commonly found in areas with reduced riparian vegetation (Teixeira 1989; Oliveira and Bennemann 2005; Gomiero and Braga 2008; Mazzoni *et al*. 2010; Bonato *et al*. 2012).

Phalloceros spiloura Lucinda, 2008 is diagnosed from its congeners by the following autapomorphies: a rounded spot located on the lower half of the caudal peduncle close to the base of the lowest caudal-fin rays, a patch of dark pigmentation on the last anal-fin ray of females, and the halves of gonopodial paired appendix straight and perpendicular to ray 3 (Lucinda 2008). Furthermore, *Phalloceros spiloura* can be distinguished from its congeners by the gonapophysis of vertebra 14 straight in adult males and the anterior orbital bone present (Lucinda 2008).

The only published recording of its distribution is in the original description of the species, where it was known to occur in the coastal drainages of Rio Grande do Sul and Santa Catarina States, including the Tramandaí, Mampituba, Tubarão, Itajaí-Açu, Itapocu, Cubatão river basins, and the inland basin of Iguaçu river in Paraná State (Lucinda 2008). In the non-type material of *Phalloceros spiloura* Lucinda (2008) also cited a single record for upper Uruguai river basin, which is not mentioned in the "distribution" section.

In June 2012, 22 specimens of *Phalloceros spiloura* (Figure 1) were captured through electrofishing in two small streams tributaries of rio Jacuí, Laguna dos Patos system (Appendix 1), an isolated coastal drainage in Rio Grande do Sul, Brazil and northeast of Uruguay (Figure 2, red circle). Even with the extensive sampling that resulted in a large number of material deposited in two fish collections from southern Brazil (Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul and Departamento de Zoologia, Universidade Federal do Rio Grande do Sul; UFRGS) previous records of *P. spiloura* in this drainage are not known, at least are not cited in the literature. As well, recent checklists from different portions of Laguna dos Patos system (*e.g.* Malabarba *et al.* 2009; 2013; Luz-Agostinho *et al.* 2010; Carvalho *et al.* 2012; Becker *et al.* 2013), did not reported *Phalloceros spiloura*.

The specimens collected were examined and identified as *Phalloceros spiloura* due to the presence of three autapomorphies cited by Lucinda (2008), namely: the rounded spot located on the lower half of the caudal peduncle close to the base of lowest caudal-fin rays present in all specimens (Figure 1), a patch of dark pigmentation on the last anal-fin rays present in all females, and the halves of gonopodial paired appendix straight and perpendicular

FIGURE 1. *Phalloceros spiloura*, male, 19.5 mm, UFRGS 17827, Divinéia stream, Municipality of Tapera, Rio Grande do Sul State, Brazil.

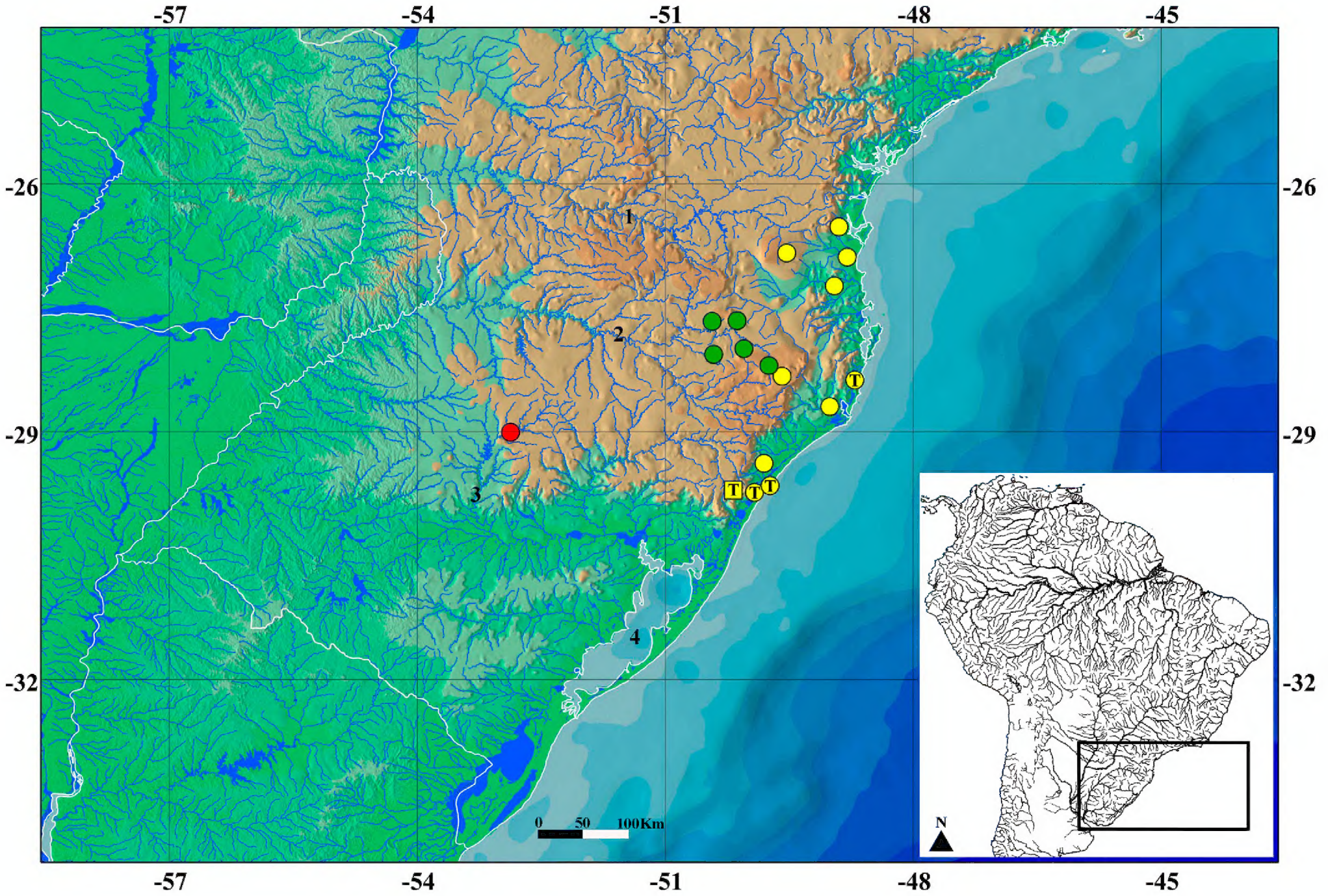

Figure 2. *Phalloceros spiloura* currently known distribution. Symbols may represent more than one locality. Yellow circles are localities from types (T) and non-types cited by Lucinda (2008); square represent type locality. Red circle is the new record from Laguna dos Patos system. Green circles are new records from the rio Uruguai basin. Abbreviations: 1, rio Iguaçu; 2, rio Uruguai; 3, rio Jacuí; 4, Laguna dos Patos.

to third gonopodial ray observed in one male cleared and stained (c&s) following the method proposed by Taylor and Van Dyke (1985). Moreover, all examined female specimens exhibited the urogenital papillae curved to right (Figure 3) and the c&s male specimen examined possesses the gonapophysis of vertebra 14 straight, which are additional characters useful in recognizing *Phalloceros spiloura*.

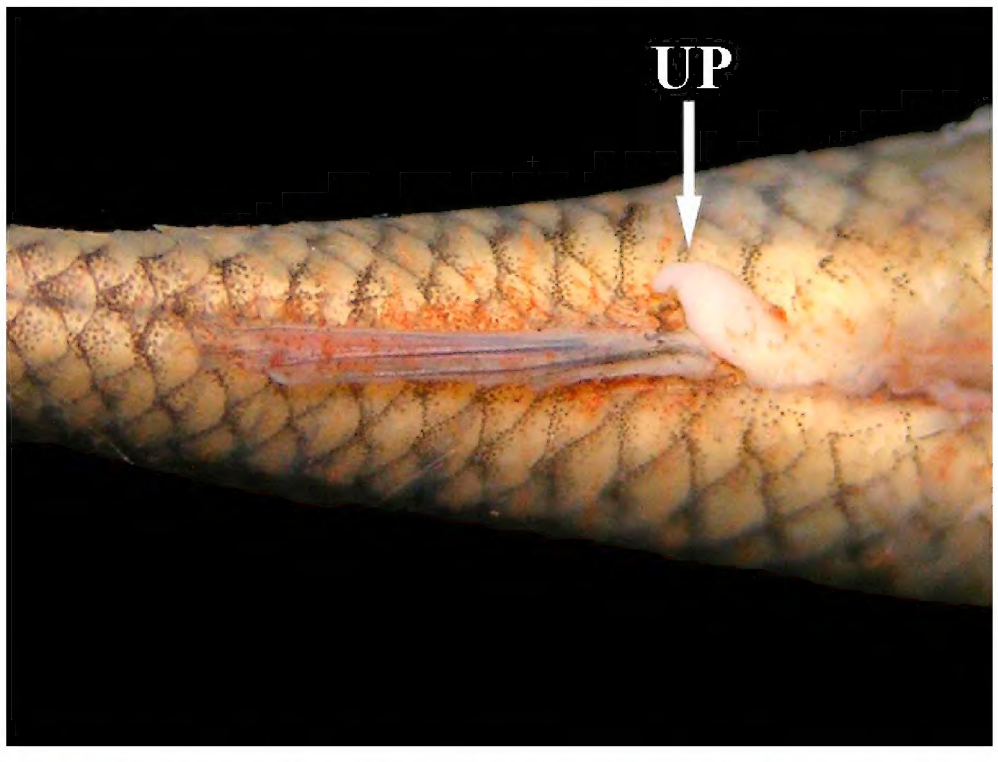

Figure 3. Urogenital papilla (UP) right curved of *Phalloceros spiloura*, 33.4 mm, UFRGS 17827, Divinéia stream, Municipality of Tapera, Rio Grande do Sul State, Brazil.

The specimens of *Phalloceros spiloura* were captured syntopically with *P. caudimaculatus* in streams of approximately 2 m wide, 10 to 60 cm depth having margins associated with floating vegetation (Figure 4). Both streams have different microhabitats as pools and rapids and bottom composed by rocky, gravel and mud (fine sediment). Its margins are eroded with little or no riparian vegetation, and surrounded by agricultural areas (mainly soybean). A preliminary analysis of stomach contents according to the volumetric method (Hyslop 1980) found a predominance of aquatic insect larvae (Chironomidae, Ephemeroptera and immature Lepidoptera) (21.30%) and detritus (76.22%).

The presence of *Phalloceros spiloura* in the rio Uruguai basin is also herein confirmed through a revisionary examination of *Phalloceros* specimens housed at UFRGS fish collection (Appendix 1). Besides the unique record cited by Lucinda (2008), nine additional holdings of *Phalloceros* specimens were recognized as *P. spiloura*. Such specimens were collected in rio Canoas and rio Caveiras in the upper portion of the rio Uruguai basin (Appendix 1; Figure 3, green circles).

These new records demonstrate that *Phalloceros spiloura* is widely distributed in the upper reaches of Laguna dos Patos system, Uruguai and Iguaçu river basins as well as in small coastal drainages from Rio Grande do Sul and Santa Catarina States.

Figure 4. Angico stream (A) and Divinéia stream (B), Municipality of Tapera, Rio Grande do Sul State, Brazil.

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Appendix 1. Material Examined. *Phalloceros spiloura*. All from Brazil. Laguna dos Patos system: Rio Grande do Sul State: UFRGS 17827, 18 (1 female c&s), Municipality of Tapera, Angico stream, Jacuí river basin, 28°39'18" S, 52°54'31" Col. K. O. Bonato, J. Ferrer, C. Vogel, L. Cavalheiro, 20/VI/2012; UFRGS 17828, 4 (1 male c&s), Municipality of Tapera, Divinéia stream, Jacuí river basin, 28°42'16" S, 52°52'26" W Col. K. O. Bonato, J. Ferrer, C. Vogel, L. Cavalheiro, 20/VI/2012; Uruguay river basin: Santa Catarina State: UFRGS 8140, 1, Municipality of Bocaina do Sul, Macacos river, 27°41'25" S, 50°03'07" W, J. Anza, J. Ferrer, M. Azevedo, 19/II/2004; UFRGS 8141, 1, Municipality of Ponte Alta, Águas Pretas river, 27°41'26" S, 50'09'51" W, Col. J. Anza, J. Ferrer, M. Azevedo, 18/XII/2004; UFRGS 8142, 1, Municipality of Palmeira, Ribeirão das Palmeiras stream tributary to Rio dos Índios river, 27°33'53" S, 5°'09'58" W, Col. J. Anza, J. Ferrer, M. Azevedo, 19/XII/2004; UFRGS 8143, 2, Municipality of Otacílio Costa, unnamed stream tributary to Águas Pretas river, 27°21'13" S, 50°08'04" W, Col. J. Anza, M. Azevedo, J. Ferrer, 18/XII/2004; UFRGS 8144, 57, Municipality of Rio Rufino, unnamed stream tributary to Canoas river, 27°53'43" S, 49°44'48" W, Col. L. Malabarba, J. Anza, J. Ferrer, G. Neves, 01/X/2004; UFRGS 8145, 4, Municipality of Ponte Alta, Rio dos Cachorros river, 27°21'34" S, 50°25'59" W, Col. J. Anza, J. Ferrer, M. Azevedo, 17/XII/2004; UFRGS 8146, 14, Municipality of Palmeira, swamp on road BR 116, Canoas river basin, 27°35'26" S, 50°07'53" W, Col. J. Anza, M. Azevedo, J. Ferrer, 19/XII/2004; UFRGS 8250, 7, Municipality of Ponte Alta, Ponte Alta river, 27°28'34" S, 50°22'45" W, Col. J. Anza, M. Azevedo, J. Ferrer, 17/XII/2005; UFRGS 8251, 3, Municipality of Lages, Amolafaca river, 27°45'40" S, 5°'25'03" W Col. J. Anza, M. Azevedo, J. Ferrer, 19/XII/2004.